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Erkek Cinsel Sağlığı

Effects of testicular prosthesis implantation on sexual function

Testis protezi implantasyonunun seksüel fonksiyon üzerine etkileri

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ABSTRACT

Purpose: Loss of one or both testicles, due to congenital or acquired causes, can lead to sexual dysfunction in men. We aimed to evaluate erectile function, sexual desire, orgasmic function, sexual satisfaction, and overall satisfaction patients with and without testicular prosthesis (TP) implantation using the International Index of Erectile Function (IIEF) scale.

Materials and Methods: The results of 53 patients, including 24 with TP implantation (+) and 29 without TP implantation (-), who were treated in our clinic between 2012 and 2020, were evaluated. The IIEF scale was used to assess erectile function, sexual desire, orgasmic function, sexual satisfaction, and overall satisfaction in the patients. Testicular prosthesis implantation (+) and TP implantation (-) patients were evaluated using the IIEF scale at 0 months, 6 months, 1 year, and 2 years.

Findings: The average age of patients in the TP implantation (+) group was 31.96 years, while the average age in the TP implantation (-) group was 31.97 years. According to the IIEF scale, erectile function, sexual desire, orgasmic function, sexual satisfaction, and overall satisfaction were significantly higher in the TP implantation (+) group compared to the TP implantation (-) group ($p<0.0001$). Within the TP implantation (+) group, the comparison of scale scores at 0 months, 6 months, 1 year, and 2 years was statistically significant ($p<0.00001$). However, in the TP implantation (-) group, the comparison of scale scores at 0 months, 6 months, 1 year, and 2 years was not statistically significant ($p>0.05$).

Conclusion: TP implantation is a safe and effective method for treating testicular loss and meets the requirements for erectile function, sexual desire, orgasmic function, sexual satisfaction and overall satisfaction as measured by the IIEF scale.

Keywords: testicular prosthesis, implantation sexual function

ÖZ

Amaç: Doğuştan veya sonradan edinilen sebeplerden dolayı bir veya iki testisin kaybı, erkeklerde cinsel işlev bozukluğuna yol açabilmektedir. Testis yokluğu nedeniyle testis protezi (TP) implantasyonu uygulanan ve uygulanmayan hastaların Uluslararası Erektil İşlev Formu (IIEF) ölçeğine göre erektil fonksiyon, cinsel istek, orgazmik işlev, cinsel ve genel memnuniyet durumlarını değerlendiren bir çalışmayı amaçladık.

Materyal ve Metot: 2012–2020 yılları arasında kliniğimizde TP implantasyonu (+) 24 hasta ve TP implantasyonu (-) 29 hasta olmak üzere 53 hastanın sonuçları değerlendirildi. Hastaların erektil fonksiyon, cinsel istek, orgazmik işlev, cinsel ve genel memnuniyet durumunu değerlendirmek amacıyla IIEF ölçeği kullanıldı. Testis protezi implantasyonu (+) ve TP implantasyonu (-) hastalar 0. ay, 6. ay, 1. yıl ve 2. yıl IIEF ölçeği ile değerlendirildi.

Bulgular: Testis protezi implantasyonu (+) hastaların yaş ortalaması 31,96 yıl idi. Testis protezi implantasyonu (-) hastaların yaş ortalaması 31,97 idi. Testis protezi implantasyonu (+) grupta IIEF ölçeğine göre erektil fonksiyon, cinsel istek, orgazmik işlev, cinsel ve genel memnuniyet TP implantasyonu (-) gruba göre anlamlıydı ($p<0,0001$). Testis protezi implantasyonu (+) grubunda 0. ay, 6. ay, 1. yıl ve 2. yıl'a göre ölçeklerin karşılaştırılması anlamlıydı ($p<0,00001$). Testis protezi implantasyonu (-) grubunda 0. ay, 6. ay, 1. yıl ve 2. yıl'a göre ölçeklerin karşılaştırılması anlamlı değildi ($p >0,05$).

Sonuç: Testis protezi implantasyonu testis kaybının tedavisi için güvenli, etkili ve IIEF ölçeğine göre erektil fonksiyon, cinsel istek, orgazmik işlev, cinsel ve genel gereksinimlerini karşılayabilen bir yöntemdir.

Anahtar kelimeler: Testis protezi, implantasyon, seksüel fonksiyon

INTRODUCTION

Erectile dysfunction (ED) is defined as the inability to achieve or maintain an erection sufficient for satisfactory sexual performance.[1] Its incidence in the literature varies between 19% and 52%.[2–5] In addition to organic causes such as vascular, neurogenic, and hormonal parameters, psychomental factors play a significant role in the etiology.[6,7]

Orchiectomy is the recommended treatment for various testicular conditions such as severe testicular atrophy, cryptorchidism, malignancy, torsion, or testicular rupture due to trauma.[8] The loss of a testis due to these conditions has a significant impact on sexual life and overall quality of life.[9–12] Furthermore, most of these conditions occur in young men during the most critical period for sexual activity.[13] To minimize psychological distress and restore

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quality of life and self-esteem, TP implantation is recommended for patients after orchiectomy.[8–10,12]

Index of erectile function is a widely recognized, effective, and reliable tool for evaluating erectile function.[14,15] It is commonly used as both a clinical and academic instrument for diagnosing and monitoring ED treatment. It is challenging to claim that the International Index of Erectile Function primarily focuses on the psychomental components of sexual health that are unrelated to erectile factors. However, as a psychometric scoring system, it is also designed to measure other parameters such as general satisfaction (GS), sexual satisfaction (SS), orgasmic function (OF), and sexual desire (SD).[16]

In this study, we aimed to evaluate erectile function, sexual desire, orgasmic function, sexual and overall satisfaction of patients with and without TP implantation using the IIEF scale.

MATERIALS and METHODS

The medical records of 24 patients with TP implantation (+) (Rigicon® Testi10™) and 29 patients without TP implantation (-) who were treated in our clinic between 2012 and 2020 were reviewed. The study was retrospective and conducted in accordance with the Declaration of Helsinki. Patients were informed that their data would be used for scientific purposes, and written consent was obtained from all participants.

Ethics Approval

The study was approved by Tokat Gaziosmanpasa University Faculty of Medicine Clinical Research Ethics Committee (Approval date and Number: 22.12.2022/83116987-033)

Patients aged above 40 years or below 25 years, those with endocrine or metabolic disorders (diabetes mellitus, hypogonadism, hypo/hyperthyroidism, hyperprolactinemia, vitamin D deficiency), chronic illnesses (hypertension, cardiovascular disease, obstructive sleep apnea syndrome, etc.), a history of chronic medication use, or a diagnosis of depression or ongoing treatment for depression were excluded from the study. Additionally, patients without a partner were not included in the study. The IIEF forms routinely requested from the patients were retrospectively analyzed. The study analyses were conducted using data from 53 patients with complete forms and laboratory results.

Patients were asked to complete the IIEF forms independently in a calm environment. For erectile function (EF), the total scores of questions 1–5 and question 15 were included in the evaluation. According to the scoring system, patients with scores between 0–10 were classified as having severe ED, 11–16 as moderate ED, 17–21 as mild-to-moderate ED, 22–25 as mild ED, and 26–30 as no ED. Based on the data obtained from the forms, other sexual health parameters were also scored and recorded. The total scores of questions 6–8 were used to evaluate sexual satisfaction (SS), questions 9–10 for orgasmic function (OF), questions 11–12 for sexual desire (SD), and questions 13–14 for overall satisfaction (OS). The IIEF forms were completed by both groups at 0 months, 6 months, 1 year, and 2 years, and the data were recorded. The TP implantation (+) patients underwent operations performed by the same physician.

Statistical Analysis

Statistical analyses were performed with MedCalc (version 20.009; Ostend, Belgium) statistical package program. Arithmetic mean, standard deviation, median, and interquartile range (IQR) were used to describe the data statistically. The Kolmogorov-Smirnov normality test was employed to evaluate the normality of the groups. The Independent t-Test was used for pairwise comparisons of normally distributed groups, while the Mann-Whitney U test was used for non-normally distributed groups. To compare the 0-month, 6-month, 1-year, and 2-year values of the parameters, repeated measures analysis of variance (ANOVA) was applied when the assumption of normality was met. For cases where the assumption of normality was not satisfied, the Friedman test was used. Post-hoc analyses were performed using Bonferroni correction for pairwise comparisons. The groups were visually represented using box-and-whisker plots. A significance level of $p<0.05$ was taken for the interpretation of the results.

RESULTS

The average age of patients in the TP implantation (+) group was 31.96 years, while the average age in the TP implantation (-) group was 31.97 years. There was no significant difference in age between the two groups ($p >0.05$) (Table 1). The mean operation duration for TP implantation (+) patients was 30 minutes (Figure 1). According to the IIEF scale, erectile function, sexual desire, orgasmic function, sexual satisfaction, and overall satisfaction were significantly higher in the TP implantation (+) group compared to the TP implantation (-) group ($p<0.0001$) (Table 2). In the TP implantation (+) group, the comparison of

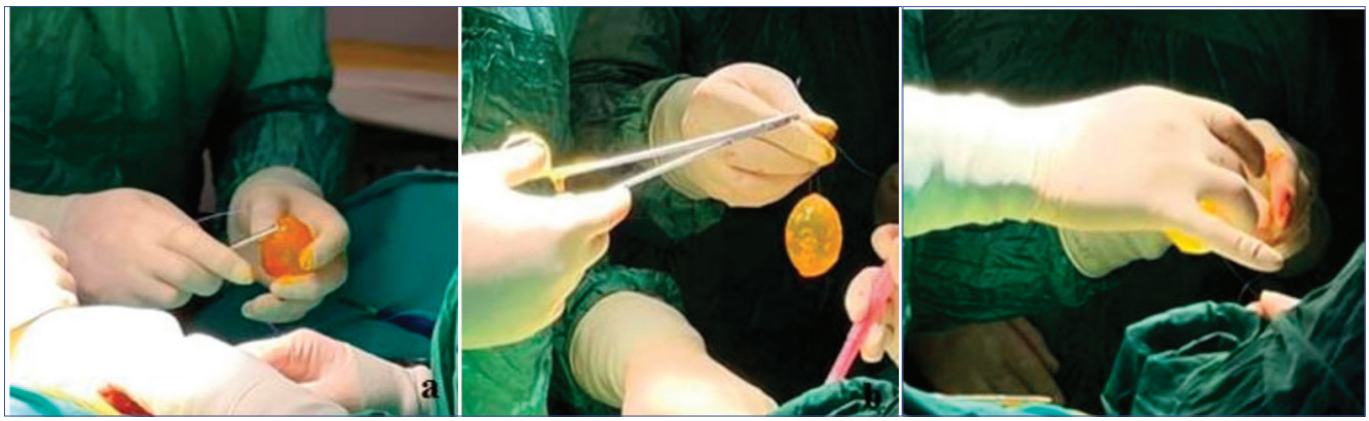

Figure 1a-c: Intraoperative Steps of TP Implantation

Table 1. Age characteristics of groups

	Testicular prosthesis implantation (-)			*Testicular prosthesis implantation (+)*			
	n	*Mean*	*SD*	*n*	*Mean*	*SD*	*P*
Age (year)	29	31.97	2.96	24	31.96	3.24	0.99

Table 2. Comparison of scales by groups

		Groups									
		Testicular prosthesis implantation (-)					*Testicular prosthesis implantation (+)*				
		n	***Median (95% CI)***			***IQR***	***n***	***Median (95% CI)***			***IQR***	***P***
Erectile function	0th month	29	20.0	19.8	21.0	2.3	24	21.0	19.7	21.3	3.0	0.710
	6th month	29	21.0	19.8	21.0	3.0	24	26.0	26.0	27.0	1.0	<0.0001*
	1st year	29	21.0	20.0	21.0	2.3	24	29.0	28.0	29.0	1.0	<0.0001*
	2th year	29	21.0	20.0	21.2	2.3	24	29.0	29.0	29.3	1.0	<0.0001*
Orgasmic function	0th month	29	7.0	6.0	7.0	1.0	24	7.0	6.0	7.0	1.0	0.573
	6th month	29	7.0	6.0	7.0	1.0	24	9.0	8.0	9.0	1.0	<0.0001*
	1st year	29	7.0	6.0	7.0	1.0	24	9.0	9.0	9.0	0.5	<0.0001*
	2th year	29	7.0	6.0	7.0	1.0	24	10.0	9.7	10.0	1.0	<0.0001*
Sexual desire	0th month	29	7.0	6.0	7.0	1.0	24	7.0	6.0	7.0	1.0	0.521
	6th month	29	7.0	6.0	7.0	1.0	24	8.5	8.0	9.0	1.0	<0.0001*
	1st year	29	7.0	7.0	7.0	0.5	24	9.0	9.0	10.0	1.0	<0.0001*
	2th year	29	7.0	6.0	7.0	1.0	24	10.0	9.0	10.0	1.0	<0.0001*
Sexual satisfaction	0th month	29	10.0	9.8	10.2	2.0	24	10.0	9.0	10.3	2.0	0.865
	6th month	29	10.0	10.0	10.2	2.0	24	13.0	13.0	14.0	1.0	<0.0001*
	1st year	29	10.0	10.0	10.0	2.0	24	14.0	14.0	14.0	0.0	<0.0001*
	2th year	29	10.0	9.8	10.0	2.0	24	15.0	15.0	15.0	0.0	<0.0001*
Overall satisfaction	0th month	29	7.0	6.8	7.0	1.0	24	7.0	6.7	7.0	1.0	0.984
	6th month	29	7.0	6.0	7.0	1.0	24	9.0	9.0	9.0	0.5	<0.0001*
	1st year	29	7.0	7.0	7.0	0.0	24	9.0	9.0	10.0	1.0	<0.0001*
	2th year	29	7.0	6.0	7.0	1.0	24	10.0	9.0	10.0	1.0	<0.0001*

* Significant difference by Mann-Whitney U test; CI: Confidence interval; IQR: Interquartile range.

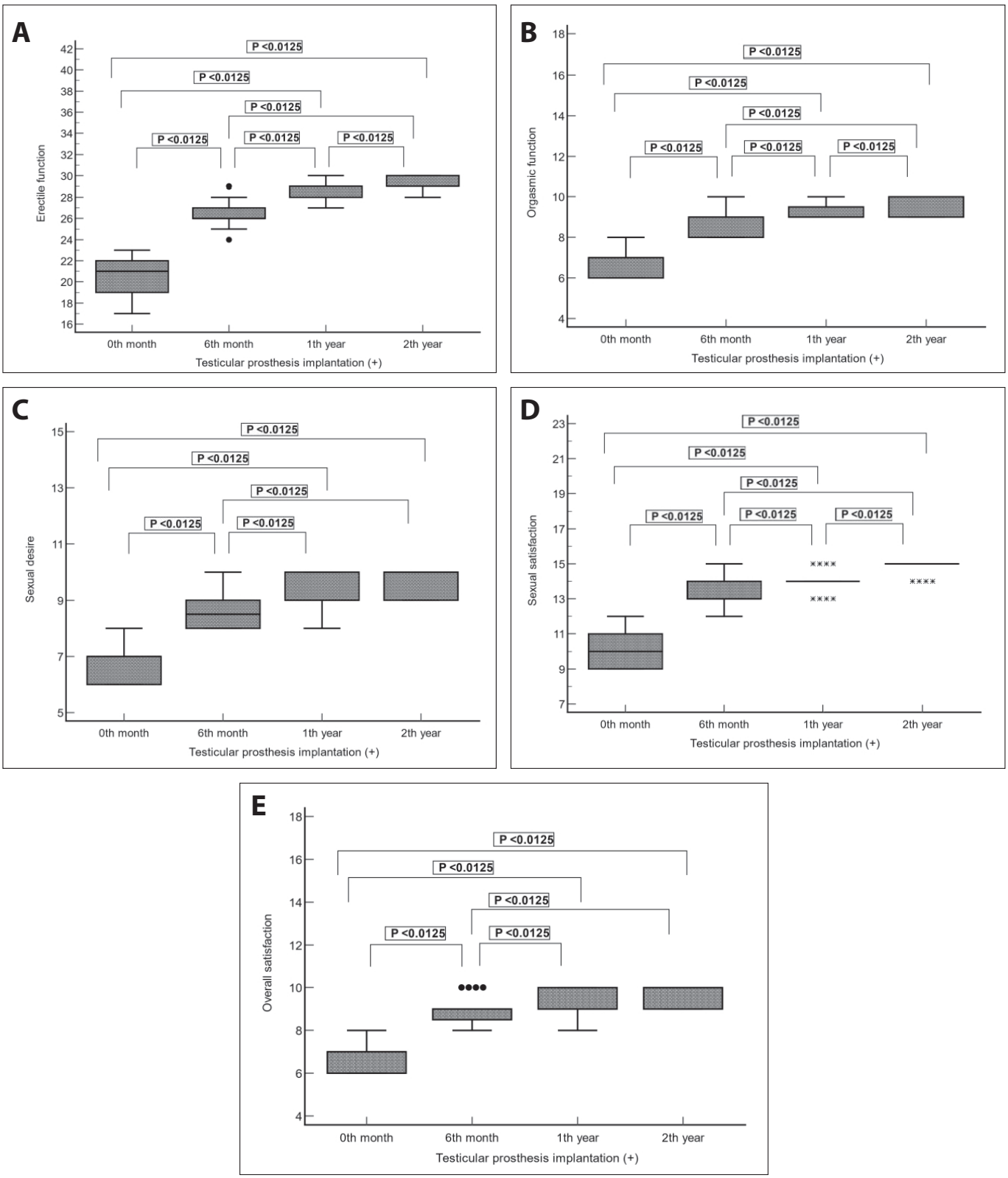

Figure 2. a–e. Temporal changes in erectile function, orgasmic function, sexual desire, sexual satisfaction and overall satisfaction scales in the TP implantation (+) group

scale scores at 0 months, 6 months, 1 year, and 2 years was statistically significant (p<0.00001) (Table 3). The temporal changes in erectile function, orgasmic function, sexual desire, sexual satisfaction, and overall satisfaction scales within the TP implantation (+) group were also significant (p<0.0125) (Figure 2). In the TP implantation (-) group, the comparison of scale scores at 0 months, 6 months, 1 year, and 2 years was not statistically significant (p>0.05) (Table 4). The etiological factors of testicular loss in patients are given in Table 5.

Table 3. Comparison of scales at 0 months, 6 months, 1 year, and 2 years in the TP implantation (+) group

	Testicular prosthesis implantation (+)												
		(1) 0th month		*(2) 6th month*		*(3) 1 th year*		*(4) 2 th year*		*Friedman Test*		*Post-hoc Analysis*		
	n	*Median*	*IQR*	*Median*	*IQR*	*Median*	*IQR*	*Median*	*IQR*	*F*	*P-value*	*Groups*	*Mean rank*	*Difference at the level of (P <0.0125)*
Erectile function	24	21.0	3.0	26.0	1.0	29.0	1.0	29.0	1.0	297.6	<0.00001*	(1)	1.000	(2) (3) (4)
												(2)	2.042	(1) (3) (4)
												(3)	3.292	(1) (2) (4)
												(4)	3.667	(1) (2) (3)
Orgasmic function	24	7.0	1.0	9.0	1.0	9.0	0.5	10.0	1.0	106.3	<0.00001*	(1)	1.021	(2) (3) (4)
												(2)	2.354	(1) (3) (4)
												(3)	3.021	(1) (2) (4)
												(4)	3.604	(1) (2) (3)
Sexual desire	24	7.0	1.0	8.5	1.0	9.0	1.0	10.0	1.0	82.5	<0.00001*	(1)	1.021	(2) (3) (4)
												(2)	2.354	(1) (3) (4)
												(3)	3.208	(1) (2)
												(4)	3.417	(1) (2)
Sexual satisfaction	24	10.0	2.0	13.0	1.0	14.0	0.0	15.0	0.0	163.7	<0.00001*	(1)	1.021	(2) (3) (4)
												(2)	2.250	(1) (3) (4)
												(3)	2.917	(1) (2) (4)
												(4)	3.813	(1) (2) (3)
Overall satisfaction	24	7.0	1.0	9.0	0.5	9.0	1.0	10.0	1.0	65.6	<0.00001*	(1)	1.021	(2) (3) (4)
												(2)	2.542	(1) (3) (4)
												(3)	3.021	(1) (2)
												(4)	3.417	(1) (2)

* Significant difference by Friedman test; IQR: interquartile range.

Table 4. Comparison of scales at 0 months, 6 months, 1 year, and 2 years in the TP implantation (-) group

	Testicular prosthesis implantation (-)										
		(1) 0th month		*(2) 6th month*		*(3) 1 th year*		*(4) 2 th year*		*Friedman Test*	
	n	*Median*	*IQR*	*Median*	*IQR*	*Median*	*IQR*	*Median*	*IQR*	*F*	*P-value*
Erectile function	29	20.0	2.3	21.0	3.0	21.0	2.3	21.0	2.3	1.88	0.139
Orgasmic function	29	7.0	1.0	7.0	1.0	7.0	1.0	7.0	1.0	0.39	0.759
Sexual desire	29	7.0	1.0	7.0	1.0	7.0	0.5	7.0	1.0	2.58	0.059
Sexual satisfaction	29	10.0	2.0	10.0	2.0	10.0	2.0	10.0	2.0	0.43	0.731
Overall satisfaction	29	7.0	1.0	7.0	1.0	7.0	0.0	7.0	1.0	1.23	0.264

IQR: interquartile range.

Table 5. Etiological factor for testicular loss in the patients

Etiological factor for testicular loss in the patients	*Total (n: 53)*	
Unilateral testicular atrophy	18	%33.9
Penetrating trauma	11	%20.8
Spermatic cord torsion	11	%20.8
Postoperative testicular atrophy	9	%16.9
Malignant testicular tumor	4	%7.6

DISCUSSION

Historically and in modern times, a functional penis symbolizes power, dominance, and fertility for men, while testes represent strength, respect, and resilience. The absence of testes can lead to psychological issues such as feelings of inferiority, reduced sexual performance, and disruptions in social and professional life, in addition to physiological problems such as testosterone deficiency and infertility.

Depression, feelings of inferiority, and loss of normal socialization due to testicular absence are commonly observed in children and young adults.[17–20] Similar to women who lose one or both breasts, young men who lose one or both testes may develop psychological issues due to a perceived distortion of their body image.[21] These problems can be effectively resolved with TP implantation.[18–20]

Testicular prosthesis implantation in individuals who have lost a testis due to various reasons leads to increased self-confidence and positive developments in social relationships.[22] As expected, testicular implants are more commonly requested by younger patients. This observation has been previously noted and supported by experiences showing that body image is more important for young men.[23–25] In our study, the patients seeking TP implantation were young men aged 25–40 years who reported feeling sexually insecure and lacking self-confidence.

In the United Kingdom, a survey was conducted among individuals who requested and declined TP implantation. Those who declined the prosthesis stated that they were content with the comfort of living with a single testis, believed that the absence of a testis would not be noticeable externally, feared surgery, and doubted the safety of the implanted prosthesis. Many respondents also indicated that they would accept the prosthesis under the condition of confidentiality.[26] In another study involving 1173 cases who experienced organ loss due to testicular cancer, 32% of the participants reported missing the presence of their testis, and 26% stated that they felt embarrassed about their condition.[25] Particularly in young men, the loss of a testis has been reported to cause distortions in body image and psychological issues. In such cases, the application of a prosthesis has been shown to reduce mental, aesthetic, and psychological disturbances, achieving a satisfaction rate of 97% even after many years.[27,28] In our study, consistent with the literature, the TP implantation (+) group demonstrated significant improvements in erectile function, sexual desire, orgasmic function, sexual satisfaction, and overall satisfaction.

Several survey studies have investigated TP implantation and patients' psychological satisfaction.[8] Catanzariti et al.[13] used three psychologically validated surveys (Body Exposure during Sexual Activities Questionnaire, Body Esteem Scale, and Rosenberg Self-Esteem Scale) and two sexually validated surveys (IIEF-5 and PEDT). The surveys completed by patients did not show statistically significant changes in erectile dysfunction ($p>0.05$) or premature ejaculation ($p>0.05$). Conversely, the psychological surveys demonstrated statistically significant changes in BESAQ ($p<0.001$) and the Body Esteem Scale ($p<0.001$), while no significant changes were observed for the Rosenberg Self-Esteem Scale ($p>0.05$). Turek and Master[29] utilized only three psychologically validated surveys (Body Exposure during Sexual Activities Questionnaire, Body Esteem Scale, and Rosenberg Self-Esteem Scale). Statistically significant increases were observed in BESAQ and the physical attractiveness subscale of the Body Esteem Scale when baseline and post-implantation assessments were compared ($p<0.001$). However, no statistically significant differences were found in scores from the Rosenberg Self-Esteem Scale (all $p>0.05$). Araújo et al.[30] used four surveys: a 31-item questionnaire and three additional validated surveys (IIEF-5, PEDT, and Rosenberg Self-Esteem Scale). No statistically significant differences were observed in sexual function (all $p>0.05$). A psychometric scoring system was not used in our study. However, in the TP implantation (+) group, erectile function, sexual desire, orgasmic function, sexual satisfaction, and overall satisfaction were found to be significantly higher according to the IIEF scale compared to the TP implantation (-) group ($p<0.0001$).

Limitation

The subjective nature of the IIEF form, the small sample size, and the single-center, retrospective design of the study are notable limitations. Additionally, the lack of partner evaluation and the absence of comparisons involving multiple surveys further limit the study's interpretative capacity.

CONCLUSION

Our study demonstrated that TP implantation is a safe and effective method for treating testicular loss and fulfills the requirements for erectile function, sexual desire, orgasmic function, sexual satisfaction, and overall satisfaction. We recommend that physicians consider suggesting TP implantation to suitable patients to alleviate the negative sexual function associated with testicular loss or following orchiectomy. We also emphasize the need for comparative studies using other assessment forms and involving larger sample sizes.

Ethics Committee Approval
The study was approved by Tokat Gaziosmanpaşa University Faculty of Medicine Clinical Research Ethics Committee. (date and number of approval: 22.12.2022/22-KAEK-284).

Peer-review
Externally peer-reviewed.

Conflict of Interest
No conflict of interest was declared by the authors.

Financial Disclosure
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REFERENCES

1. NIH Consensus Conference. Impotence. NIH Consensus Development Panel on Impotence. JAMA. 1993;270(1):83–90. [CrossRef]
2. Feldman HA, Goldstein I, Hatzichristou DG, Krane RJ, McKinlay JB. Impotence and its medical and psychosocial correlates: results of the Massachusetts Male Aging Study. J Urol. 1994;151(1):54–61. [CrossRef]
3. Braun M, Wassmer G, Klotz T, Reifenrath B, Mathers M, Engelmann U. Epidemiology of erectile dysfunction: results of the 'Cologne Male Survey'. Int J Impot Res. 2000;12(6):305–11. [CrossRef]
4. Johannes CB, Araujo AB, Feldman HA, Derby CA, Kleinman KP, McKinlay JB. Incidence of erectile dysfunction in men 40 to 69 years old: longitudinal results from the Massachusetts male aging study. J Urol. 2000;163(2):460–3. [CrossRef]
5. Schouten BW, Bosch JL, Bernsen RM, Blanker MH, Thomas S, Bohnen AM. Incidence rates of erectile dysfunction in the Dutch general population. Effects of definition, clinical relevance and duration of follow-up in the Krimpen Study. Int J Impot Res. 2005;17(1):58–62. [CrossRef]
6. Irwin GM. Erectile Dysfunction. Prim Care. 2019;46(2):249–55. [CrossRef]
7. Corona G, Petrone L, Mannucci E, Mansani R, Balercia G, Krausz C, et al. Difficulties in achieving vs maintaining erection: organic, psychogenic and relational determinants. Int J Impot Res. 2005;17(3):252–8. [CrossRef]
8. Srivatsav A, Balasubramanian A, Butaney M, Thirumavalavan N, McBride JA, Gondokusumo J, et al. Patient attitudes toward testicular prosthesis placement after orchiectomy. Am J Mens Health. 2019 Jul-Aug;13(4):1557988319861019. [CrossRef]
9. Dieckmann KP, Anheuser P, Schmidt S, Soyka-Hundt B, Pichlmeier U, Schriefer P, et al. Testicular prostheses in patients with testicular cancer -acceptance rate and patient satisfaction. BMC Urol. 2015;15:16. [CrossRef]
10. Girdansky J, Newman HF. Use of a vitallium testicular implant. Am J Surg. 1941;53:514. [CrossRef]
11. Hayon S, Michael J, Coward RM. The modern testicular prosthesis: patient selection and counseling, surgical technique, and outcomes. Asian J Androl. 2020;22(1):64–9. [CrossRef]
12. Clifford TG, Burg ML, Hu B, Loh-Doyle J, Hugen CM, Cai J, et al. Satisfaction with testicular prosthesis after radical orchiectomy. Urology. 2018;114:128–32. [CrossRef]
13. Catanzariti F, Polito B, Polito M. Testicular prosthesis: Patient satisfaction and sexual dysfunctions in testis cancer survivors. Arch Ital Urol Androl. 2016;88(3):186–8. [CrossRef]
14. Weiss P, Brody S. International Index of Erectile Function (IIEF) scores generated by men or female partners correlate equally well with own satisfaction (sexual, partnership, life, and mental health). J Sex Med. 2011;8(5):1404–10. [CrossRef]
15. Rosen RC, Riley A, Wagner G, Osterloh IH, Kirkpatrick J, Mishra A. The international index of erectile function (IIEF): a multidimensional scale for assessment of erectile dysfunction. Urology. 1997;49(6):822–30. [CrossRef]
16. Burnett AL. Commentary RE. The International Index of Erectile Function (IIEF): A Multidimensional Scale for Assessment of Erectile Dysfunction. Urology. 2020;145:308–9. [CrossRef]
17. Rose M, Aberg M, Bohn J. Testicular prosthetic implants in boys and teenagers with primary or secondary anorchism. Scand J Plast Reconstr Surg Hand Surg. 2008;42(2):101–4. [CrossRef]
18. Bodiwala D, Summerton DJ, Terry TR. Testicular prostheses: development and modern usage. Ann R Coll Surg Engl. 2007;89(4):349–53. [CrossRef]
19. Elder JS, Keating MA, Duckett JW. Infant testicular prostheses. J Urol. 1989;141(6):1413–5. [CrossRef]
20. Beer M, Kay R. Testicular prostheses. Urol Clin North Am. 1989;16(1):133–8. [CrossRef]
21. Bolat MS, Aşcı R, Açıkgöz A, Büyükalpelli R. An update on testicular prostheses. Turk J Urol. 2011;37(2):128–35. [CrossRef]
22. Incrocci L, Bosch JL, Slob AK. Testicular prostheses: body image and sexual functioning. BJU Int. 1999;84(9):1043–5. [CrossRef]
23. Robinson R, Tait C, Clarke N, Ramani V. Is it safe to insert a testicular prosthesis at the time of radical orchidectomy for testis cancer -an audit of 904 men undergoing radical orchidectomy. BJU Int 2016;117(2):249–52. [CrossRef]
24. Schmidt S, Wagner W, Ruf CG. Evaluation der persönlichen Entscheidungskriterien für oder gegen die Implantation einer Hodenprothese. J Reproduktionsmed Endokrinol. 2013;10(5):309.
25. Skoogh J, Steineck G, Cavallin-Ståhl E, Wilderäng U, Håkansson UK, Johansson B, et al. Feelings of loss and uneasiness or shame after removal of a testicle by orchidectomy: a population-based long-term follow-up of testicular cancer survivors. Int J Androl. 2011;34(2):183–92. [CrossRef]
26. Chapple A, McPherson A. The decision to have a prosthesis: a qualitative study of men with testicular cancer. Psychooncology. 2004;13(9):654–64. [CrossRef]
27. Zilberman D, Winkler H, Kleinmann N, Raviv G, Chertin B, Ramon J, Mor Y. Testicular prosthesis insertion following testicular loss or atrophy during early childhood –technical aspects and evaluation of patient satisfaction. J Pediatr Urol. 2007;3(6):461–5. [CrossRef]
28. Nichols PE, Harris KT, Brant A, Manka MG, Haney N, Johnson MH, et al. Patient decision-making and predictors of genital satisfaction associated with testicular prostheses after radical orchiectomy: a questionnaire-based study of men with germ cell tumors of the testicle. Urology. 2019;124:276–81. [CrossRef]
29. Turek PJ, Master VA; Testicular Prosthesis Study Group. Safety and effectiveness of a new saline filled testicular prosthesis. J Urol. 2004;172(4 Pt 1):1427–30. [CrossRef]
30. Araújo AS, Anacleto S, Rodrigues R, Tinoco C, Cardoso A, Oliveira C, Leão R. Testicular prostheses –impact on quality of life and sexual function. Asian J Androl. 2024;26(2):160–4. [CrossRef]